studies were designed to compare and contrast the influence of hypercholesterolemia on the local and systemic inflammatory response to demand ischemia (ie, exercise) in a murine model of vascular occlusive disease.

Methods: Apolipoprotein $E^{-/-}$ (ApoE) and aged C57BL6 (C57) mice underwent unilateral femoral artery ligation. At day 14, animals were divided into sedentary and exercise groups. Basal hind limb and demand ischemia was quantified using laser Doppler imaging. Neurologic function was quantified using a standardized scale. Animals in the exercise groups underwent daily treadmill exercise (15 m/min, 10° incline) on days 14 through 28. On day 28, serum and skeletal muscle from ischemic and contralateral limbs were harvested immediately after exercise for measurement of keratinocyte-derived chemokine (KC), vascular endothelial growth factor (VEGF), interleukin (IL)-6, macrophage inflammatory protein (MIP)-2, and histology.

Results: The degree of ischemia and neurologic function was similar between groups before initiation of exercise. Under sedentary conditions, compared with C57 mice, plasma VEGF and IL-6, but not KC or MIP-2 were higher in ApoE mice. After exercise, serum levels of VEGF, KC, and MIP-2, but not IL-6, were lower in ApoE compared with C57 mice. Local response to demand ischemia was higher in ApoE mice as measured by KC levels. ApoE mice produced a significant increase in the percentage of immature centrally nucleated skeletal muscle fibers under both sedentary and demand conditions (Table).

Conclusion: In the setting of demand ischemia, the systemic inflammatory response is different in ApoE mice compared with C57 mice. The altered inflammatory response to exercise in hypercholesterolemic mice may play a role in postischemic skeletal muscle remodeling and mimic postischemic muscle dysfunction in humans with claudication.

Table. Comparison between sedentary and exercise groups

	Sedentary			Exercise		
Variable	*ApoE$^{-/-}$*	*C57RB*	*P*	*ApoE$^{-/-}$*	*C57RB*	*P*
Plasma KC	227.8 ± 95.2	301.3 ± 29.8	NS	104.9 ± 14	485.1 ± 59.7	<.0001
Plasma IL-6	62.7 ± 30	1.7 ± 0.6	<.0001	19.0 ± 5.7	6.7 ± 1.7	<.05
Plasma VEGF	258.4 ± 13.4	78.2 ± 7.8	<.0001	167.2 ± 15.6	245.0 ± 25.0	<.01
Plasma MIP-2	20.4 ± 8.1	14.6 ± 2.1	NS	8.3 ± 1.4	18.1 ± 3.3	<.01
Muscle KC	1.7 ± 0.2	1.2 ± 0.1	NS	2.8 ± 0.4	1.8 ± 0.2	<.05
Muscle IL-6	5.7 ± 0.8	4.9 ± 0.4	NS	5.6 ± 0.6	5.9 ± 0.4	NS
Centrally nucleated fibers	72.6 ± 1.7	60.8 ± 2.6	<.001	77.2 ± 4.3	56.3 ± 5.5	<.05

ApoE, Apolipoprotein E; *IL,* interleukin; *KC,* keratinocyte-derived chemokine; *MIP,* macrophage inflammatory protein; *VEGF,* vascular endothelial growth factor.

Long-Term Results of Open Versus Endovascular Revascularization of Superficial Femoral Artery Occlusive Disease: A Case-Control Series

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Introduction: We performed a case-control comparison of long-term results of femoral-popliteal bypass and superficial femoral artery (SFA) endovascular interventions to examine characteristics of patients and procedures to optimize results.

Methods: Femoral-popliteal bypasses and SFA interventions performed for consecutive patients with symptoms (Rutherford 3 to 6) between 2001 and 2008 were reviewed. Time-dependent outcomes were assessed with Kaplan-Meier survival analyses. Log-rank analyses, univariate, and multivariate analyses were performed.

Results: During the study period, 152 limbs in 141 patients (66% male; mean age, 66 ± 22 years) underwent femoral-popliteal bypass; 233 limbs in 204 patients (49% male; mean age, 70 ± 11 years) underwent SFA intervention. Surgery was performed less commonly for claudication (46% vs 56%) and more commonly for critical ischemia (54% vs 44%). Six-year primary, primary assisted, and secondary patency rates were 56%, 64%, and 75%, respectively, for bypass patients and 40%, 67%, and 85%, respectively, for SFA interventions. Six-year limb salvage was 80% for surgery and 92% for SFA interventions. Complications occurred in 21% of the surgery group and in 1.2% of the endovascular group. Reintervention was required in 24% of surgery patients and in 14% of endovascular patients. Failure of SFA intervention led to bypass in 5% of patients; however, prior failed intervention did not change the target artery. Predictors of failure for surgery and SFA interventions were female gender, diabetes, creatinine >1.8 mg/dL, and critical limb ischemia; however, limb salvage was no different for all groups.

Conclusions: Although long-term patency and limb salvage were equivalent, reinterventions and complications occurred at a higher rate in the surgery group. Patients with critical limb ischemia, diabetes, or renal failure had decreased patency with both treatments; however, limb salvage was not disadvantaged for any group. SFA stent placement should therefore be the initial therapy for patients with SFA occlusive disease.

Pushing the Limits of Endovascular Intervention: Short-Term Outcomes for TransAtlantic Inter-Society Consensus II D Lesions

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Introduction: Advances in endovascular techniques have provided new options in the treatment of complex infrainguinal occlusive disease. This study evaluated outcomes of endovascular interventions on TransAtlantic Inter-Society Consensus (TASC II) D femoropopliteal lesions.

Methods: All patients undergoing endovascular interventions for femoropopliteal occlusive disease between May 2003 and March 2009 were included. Patient demographics, preprocedural and postprocedure ankle-brachial indices (ABI), and anatomic factors were analyzed.

Results: During the period reviewed, 455 limbs were treated. The study group included 75 TASC D limbs in 70 patients (59% men; mean age, 74.8 ± 11.9 years). Fifty-three limbs (71%) underwent treatment for critical limb ischemia, including 40 (53%) with tissue loss; 29% were treated for lifestyle-limiting claudication. Eleven (15%) had previous failed bypasses. Preoperative ABIs could not be obtained in 20 patients because of noncompressible vessels. The remaining 55 had a mean baseline ABI of 0.56 ± 0.21. No procedurally related deaths or major complications occurred. Mean increase in ABI postprocedure was 0.52 ± 0.28. Mean follow-up of 9.0 months (range, 1-25 months) was available for 65 limbs, during which 17 (21%) underwent successful reintervention for restenosis. Occlusion occurred in six limbs (8%): three were revascularized with an endovascular intervention, and three remained asymptomatic and were managed conservatively. Proximal trifurcation involvement ($P = .95$) and the presence of less than two tibial runoff vessels ($P = .87$) were not associated with a higher risk of restenosis or occlusion. The primary patency rate was 77%, the primary assisted patency was 92%, and the secondary patency rate was 96%. Limb salvage was achieved in all patients treated for critical limb ischemia.

Conclusions: Endovascular interventions for TASC II D lesions can be safely performed with excellent hemodynamic improvement and limb salvage rates. Restenosis is not uncommon in this population, which mandates strict surveillance. Further follow-up is necessary to determine the long-term efficacy of these interventions.

Standardized Techniques for Percutaneous Treatment of Superficial Femoral Artery-Popliteal TransAtlantic Inter-Society Consensus C and D Lesions Improve Outcomes: Midterm Analysis of a Prospective Intent-to-Treat Study

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Purpose: To better understand the implications of the percutaneous superficial femoral artery (SFA)-popliteal procedure techniques, we compared the patency of treating TransAtlantic Inter-Society Consensus (TASC) C and D lesions by using a standardized vs a nonstandardized approach.

Methods: From 2004-2008, 352 patients with symptomatic infrainguinal SFA-popliteal TASC C and D lesions undergoing angioplasty and routine stenting were divided into groups according to technique. The standardized technique was used in 173 (49%) and the nonstandardized in 179 (51%). The standardized technique included (1) initial subintimal angioplasty at higher balloon pressures (20-25 atm), (2) 20% balloon oversizing, (3) stent placement after angioplasty, (4) minimum stent overlap of <1 cm, and (5) treatment of moderate and severe SFA-popliteal occlusive disease. The nonstandardized technique included most routine approaches currently used, not adhering to standardization. Patients were monitored at 1-, 3-, and 6-month intervals with duplex ultrasound imaging, peripheral vascular resistance measurements, and clinical examination. The Society for Vascular Surgery criterion was used to define patency failure.

Results: The standardized technique group had significantly higher American Society of Anesthesiologists classification of III to IV (77% vs 49%, $P < .05$), longer mean lesion lengths (26.5 vs 16.1 cm, $P < .05$), and a

higher incidence of TASC D lesions (55% vs 26%, $P < .05$) compared with the nonstandardized group. The two groups did not differ significantly in technical success (standard, 96%; nonstandard, 93%); indications for the procedure, including disabling claudication, rest pain, or tissue loss (standard, 59%, 10%, and 31% vs 52%, 11%, 37%), or the mean increase in ABI (0.36 vs 0.41). At mean follow-up of 20 months, the standardized technique group had significantly higher primary patency (83% vs 66%, $P < .05$), and no difference in limb loss (1.2% vs 3.4%) compared with the nonstandardized group.

Conclusions: Our findings suggest that even with longer lesions, the standardized technique for treatment of SFA and popliteal TASC C and D lesions has a significant effect on improving the primary patency.